REMARKS

Review and reconsideration on the merits are requested.

Formalities

Applicants appreciate the Examiner returning two initialed PTO/SB/08.

The Prior Art

U.S. 2006/0037471 Zhu et al (Zhu); U.S. 2005/0076975 A1 Lopez et al (Lopez); U.S. 2006/0285989 A1 Schade (Schade).

The Rejections

Claims 1-4 as anticipated by Zhu.

Claims 5-9 and 11-22 as obvious over Lopez.

Claim 10 as obvious over Lopez in view of Schade.

The Examiner's position on the prior art and the rejection is set forth in the Action and will not be repeated here except as necessary to an understanding of Applicants' traversal which is now presented.

Applicants rely primarily on their priority document (certified translation enclosed).

Support for the claims of the present application occurs therein as follows, where all references to a paragraph in a [] is to the certified translation of Japanese Patent Application 2003-097015(enclosed).

Claim 1 herein: claim 1 of the certified translation, [0013], lines 13/14.

Claim 2 herein: claim 2 of the certified translation, [0014].

Claim 3 herein: claim 3 of the certified translation, [0015], lines 10-12.

Claim 4 herein: [0015], line 12; [0058], lines 8-12, [0015], line 11; Fig. 1, Nos. 13 and 15 explained at [0058], lines 10-12.

Claim 5-8 herein: The inventors of the present application found that carbides, particularly eutectic carbides, in a matrix microstructure of the cast steel used for a piston contribute to the improvement of high-temperature yield strength and high-temperature rigidity of the piston as shown in the disclosure "C forms a cementite in the pearlite phase and forms carbides with elements such as Nb, V, Ti, etc., thereby producing effect for securing a high-temperature yield strength" in paragraph [0026], "Nb is combined with C in the δ-M cast steel to form fine Nb carbides (NbC), thereby increasing high-temperature yield strength and preventing them from coarsening their crystal grains" in paragraph [0034] and "In the δ-M cast steel, a larger C content may lower an Ms point, leaving too much austenite at room temperature, thereby failing to obtain high-temperature yield strength and high-temperature rigidity. By restricting Nb functioning to form NbC, lower a C content in an austenite, and thus prevent the lowering of the Ms point of the matrix, and Ni lowering the Ms point to a range of $0.05 < ((C\% + 0.15\ Ni\% - 0.10\ Nb\%) \leq 0.80$, the desired high-temperature yield strength and high-temperature rigidity can be obtained" in paragraph [0036] of the certified translation.

As a result of research focusing on the eutectic carbides, the inventors found that the optimization of a composition range of Si, Ni, Cr, Cu, etc., besides C and Nb, makes it possible to sufficiently improve many properties of the piston such as high-temperature yield strength, high-temperature rigidity, ductility, wear resistance, seizure resistance, thermal cracking resistance, castability, machinability, etc.

Thus, claims 5-8 of the present application are specifically adjusted in their respective composition ranges in both upper limit and lower limits to the optimum range based on the certified translation.

Claim 9 herein: [0019], last two lines (substantially).

Claim 10 herein: claim 7 in the certified translation; [0027] at lines 10-12.

Claim 11 herein: [0035]; [0038].

Claim 12 herein: [0037].

Claims 13-16 herein: Claims 13-16 of the present application are directed to the amount, size, composition, etc., of eutectic carbides in the microstructure of the cast steel, which make it possible to improve many properties of the piston. Features of these claims have been obtained by the inventors based on the certified translation in the same manner as discussed above..

Claim 16 herein: see [0034], line 24.

Claim 17 herein: see [0016], lines 24-26.

Claim 18 herein: see [0016], lines 24-25.

Claim 19 herein: see [0021] and [0022].

Claim 20 herein: Claim 20 of the present application is related to the first cast steel (α-P cast steel). This relation is described in claim 13 and paragraph [0039] of the certified translation. The composition range of claim 20 is recited in claim 5. Claim 5 is specifically adjusted to recite a composition range suitable for improving many properties of the piston based on the certified translation in the same manner as discussed above.

Claims 21 and 22 herein: Claim 22 relates to the second cast steel (δ-M cast steel) also claim 21 also relates to the second cast steel (δ-M cast steel).

The relationship of claims 21 and 22 to the second cast steel is described at page 7, lines 11-15 of the specification, and is supported by claims 14 and 15 as well as the description in paragraph [0040] of the certified translation.

Applicants amend claim 21 from "The method for producing an internal engine piston according to claim 20, wherein said cast steel is cast, held at 450°C or higher, and then air-

cooled" to independent form of --A method for producing an integrally cast steel piston for internal engines, said cast steel having a composition comprising, by mass, 0.1-0.8% of C, 3% or less of Si, 3% or less of Mn, 0.2% or less of S, 10% or less of Ni, 30% or less of Cr, 6% or less of Cu, and 0.05-8% of Nb, the balance being substantially Fe and inevitable impurities, wherein said cast steel is cast, held at 450°C or higher, and then air-cooled.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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